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**Narholz et al.**

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(54) **APPARATUS FOR CONVEYING AND  
PRE-HEATING A METAL CHARGE FOR A  
MELTING PLANT AND CONNECTED  
METHOD**

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CPC ..... **F27D 13/00** (2013.01); **C21C 5/527**  
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(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,144,243 A \* 8/1964 Henson ..... C21D 1/767  
432/152

3,301,662 A 1/1967 Ban  
(Continued)

FOREIGN PATENT DOCUMENTS

DE 1020080371111 2/2010  
IT 1359081 3/2005  
(Continued)

OTHER PUBLICATIONS

International Search from Application No. PCT/IB2010/003206  
mailed Aug. 25, 2011.

(Continued)

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(57) **ABSTRACT**

Apparatus for continuously conveying and pre-heating a metal charge inside a container of a melting plant, includes at least a channel for conveying the metal charge, at least a hood disposed above the conveyor channel defining a tunnel and/or an expansion chamber, inside which at least part of the fumes exiting from the container advance, and apertures made in cooperation with lateral walls of the conveyor channel to discharge the fumes. The conveyor channel includes an activator that divert the fumes and/or delimit the zone occupied by the metal charge of the conveyor channel, and that cooperate longitudinally with at least part of the conveyor channel.

**7 Claims, 7 Drawing Sheets**

